

## COMMAND PROCESSING CONFIDENCE TEST - EOC2

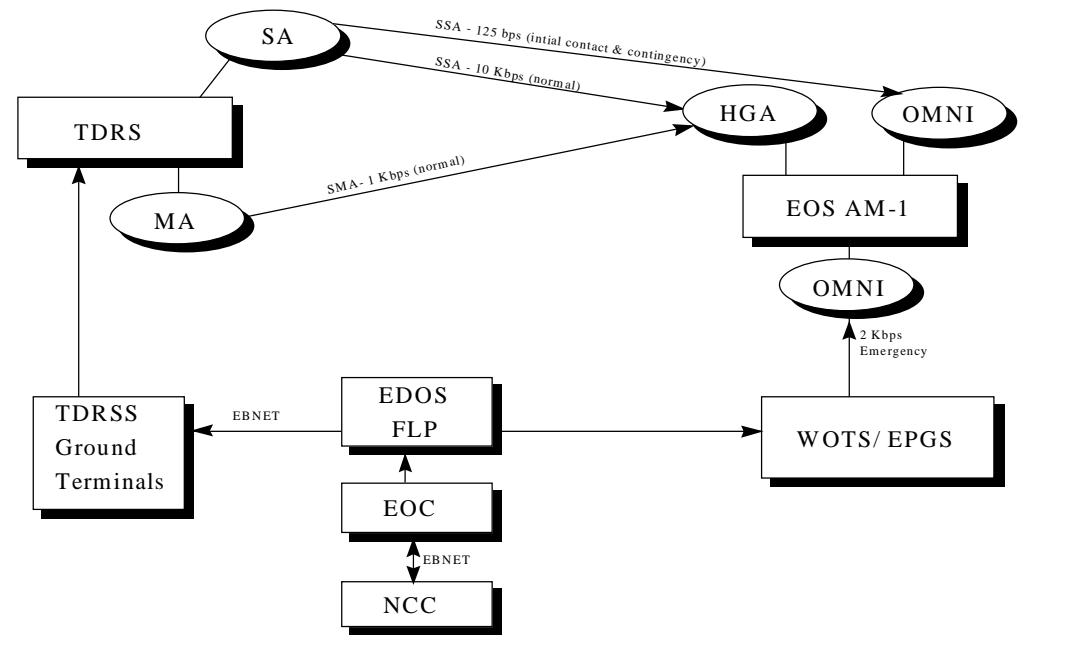
### Background Information:

Planning and scheduling activities produce the detailed activity schedule that is used for command generation. An integrated schedule of activities for instruments and spacecraft subsystems is produced, and the ground scripts and command loads necessary to implement the scheduled activities are generated. FOS collects and validates the commands, software memory loads, table loads and instrument memory loads necessary to implement the instrument and spacecraft scheduled activities.

The command data is transmitted to EDOS for uplink to the spacecraft during each real-time contact. Command requests can be received from the ISTs in real-time by the operational staff or as preplanned command groups generated by the Command Management Service. Command execution on-board the spacecraft is verified via returned telemetry.

FOS maintains the current spacecraft memory image and performs memory dump compare operations, as requested.

Exhibit EOC2-1 illustrates the paths and associated rates for uplink from EOC to the EOS AM-1 spacecraft [based on ref 16 page 2000-3]. The three path rates from TDRS to EOS AM-1 will be verified in this test, the emergency path via GN/WOTS will be verified in test EGS2.



**EXHIBIT EOC2-1: AM-1 Uplink Paths**

Test Objectives:

The command processing confidence test will:

- perform real-time commanding and load uplinks at all rates to the prime and back-up Command and Telemetry Interface Units(CTIU)
- verify proper implementation of CCSDS commanding protocols, and inhibition of critical and hazardous commanding
- verify ability to conduct Onboard Computer (OBC) load, dump, and compare sequences.

Test Configuration:

Exhibit EOC2-2 illustrates the Command Processing Test configuration with EOC, EDOS, and the ETS MPS being used to simulate the spacecraft. EDOS V3 and the ETS will be located at GSFC building 32.

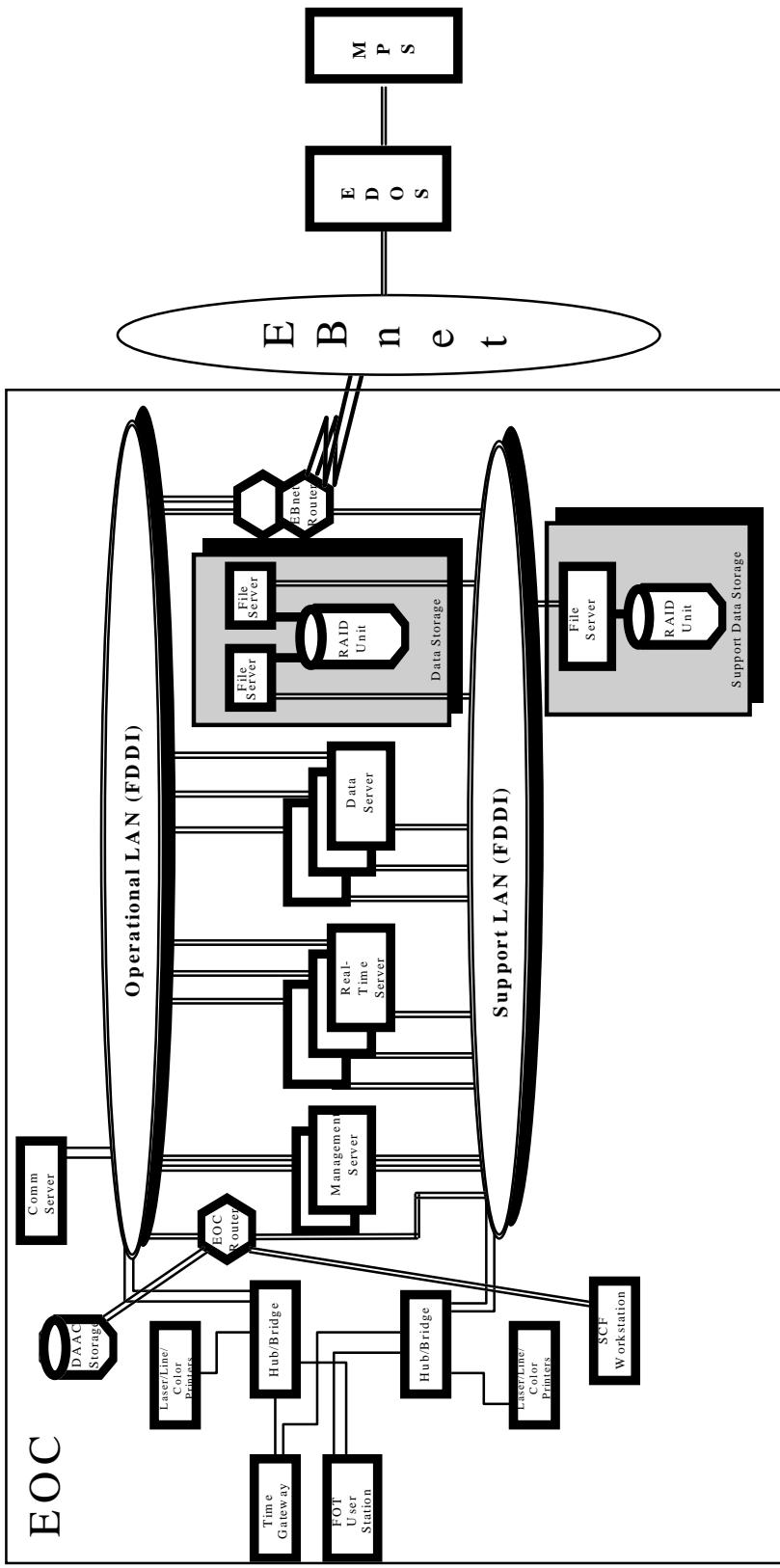


EXHIBIT EOC2-2: AM-1 Command Processing Confidence Test Configuration

Participants and Support Requirements:

Participants:

EDOS LZPF M&O - Will setup Forward Link at the desired rate (125 bps, 1 kbps, 10 kbps). Will setup Return Link for 16 kbps Housekeeping on I or Q channel (depending on test). During test case EOC2.4 will assist in causing intentional communication errors between EOC and ETS MPS (S/C simulation).

I&T Test Conductor - responsible for scheduling resources, coordination of test execution, and reporting of test results.

ETS MPS Operator - Will setup for 16 kbps Housekeeping Return Link telemetry Housekeeping on I or Q channel (depending on test) and receipt of commands from EOC at various rates.

Communications:

1. Voice:

Telephone  
CCL 74 Circuit - EOC/EDOS  
CCL 94 Circuit - EOC/EDOS/ETS  
CCL 113 Circuit - EOC/EDOS/EBnet

2. Data:

EBnet circuit from EOC to EDOS LZPF  
EBnet circuit from EDOS to ETS MPS  
EBnet circuit from EOC to ETS MPS

3. IP addresses:

Operational LAN 198.118.199.0  
Support LAN 198.118.200.0

Equipment and Software:

Hardware:

FOS Release B hardware

Software:

FOS Release B software  
EDOS Version 3 software  
EDOS Version C1 software (December 97)

EOC Port assignments:

Data Stream	APID	Port
Outgoing command blocks to EDOS	NA	20058
Q-channel CLCW	NA	20051

I-channel CLCW	NA	20050
I-channel Housekeeping telemetry	1	20001
I-channel Health and Safety telemetry	2	20002
I-channel 16 kbps SCC diagnostic dump	3	20003
I-channel standby telemetry	5	20004
I-channel 1 kbps SCC diagnostic dump	6	20005
Q-channel Housekeeping telemetry	1	20010
Q-channel Health and Safety telemetry	2	20011
Q-channel 16 kbps SCC diagnostic dump	3	20012
Q-channel standby telemetry	5	20013
Q-channel 1 kbps SCC diagnostic dump	6	20014
CODA from EDOS	NA	20056

Test Tools:

ETS MPS Release 1.3.0 (S/C simulation mode) - sends telemetry in CADU format to EDOS. Receives commands from EOC via EDOS.

ETS MPS Release 1.3.0 (EDOS simulation mode) - sends telemetry in EDU format to the EOC. Receives commands in the form of CDBs from EOC. (May be used during dry runs.)

Test Data:

Description/Characteristics	Source	File/Script Name & Location
Relative Time Command load - to build an RTCS for an instrument	From test EOC3.4 or generated prior to test	
Absolute Time Command Table load	From test EOC3.4 or generated prior to test	
TDRS position table load	FOT	
Instrument Microprocessor Load (Command Table, Data Table)	From test EOC3.4, an IST, ETS or SSIM	
Instrument S/W Update (ASTER, CERES, MISR, MODIS, or MOPITT)	From test EOC3.4, an IST, ETS or SSIM	
Proc with 5 commands (See Exhibit 2-5)	SI&T pretest generation	EOC21_5CMDS EOC22_5CMDS EOC23_5CMDS

**EXHIBIT EOC2-5: Commands for EOC2x\_5CMDS PROCs**

CMD_MNEM	CMD_PID	CMD_TYPE	RT_NAME	*
<b>EOC21_5CMDS</b>				
TCS_DISABLE_SFEHTRB	1	BDU Relay Pulse	Recorder BDU	IFS
AST_TURN_OFF_C_SQL	1958	ERT Serial	ASTER	2FS
CDH_SET_CT1SBT2B1CH2	2717	ERT Serial:	CTIU1	5FS
CDH_OPEN_CT1_UNLOCK	2388	CTIU BC	CTIU1	1FS
CDH_TURN_OFF_SCC1	724	BDU Logic Pulse	C&DH/COMM BDU	1FH
<b>EOC22_5CMDS</b>				
CDH_SET_SFEAMODDAS2E	2212	BDU Serial CMD	Recorder BDU	2FS
CEF_TURN_ON_SURV_B	1263	BDU Relay Pulse	MIS/MOP/CER BDU	1FS
COM_STEP_HGA_AZ Number_Steps=81	904	ERT Serial	HGA-1	2VS
EAS_FIRE_HGA_BOX1B	628	BDU Relay Pulse	RWA BDU	1FH
EPS_DISABLE_EODAOVRD	580	BDU Serial CMD	C&DH/COMM BDU	2FS
<b>EOC23_5CMDS</b>				
CDH_GET_CT1_TBL_CRC CRC_VALUE=0 SEGMENT_OFFSET=4294967295 TABLE_ID=65536 WORD_COUNT=4294967295	2407	ERT Serial	CTIU1	8VS
MIS_SET_SAFE_MODE	2135	ERT Serial	MISR (sub_add - SAFE MODE COMMAND)	1FH

CMD_MNEM	CMD_PID	CMD_TYPE	RT_NAME	*
FSW_INITIATE_ATCSCC1 LOAD_DESCR_HIGH=0000000065535 LOAD_DESCR_LOW=00000000000000 START_HIGH=0000000065535 START_LOW=00000000000000 WORD_COUNT_HIGH=0000000065535 WORD_COUNT_LOW=00000000000000 CRC_HIGH=0000000065535 CRC_LOW=00000000000000	99999	ERT Load Init	SCC1 (sub_add - Memory Load)	8VS
GNC_SET_POSSENSA XM_SENSOR=15.0	2802	BDU Serial CMD	GN&C BDU	2FS
TCS_DISABLE_REAV01HB	41	BDU Relay Pulse	PROP BDU	1FS

\*last column is: word\_cnt, word\_type, safety\_level

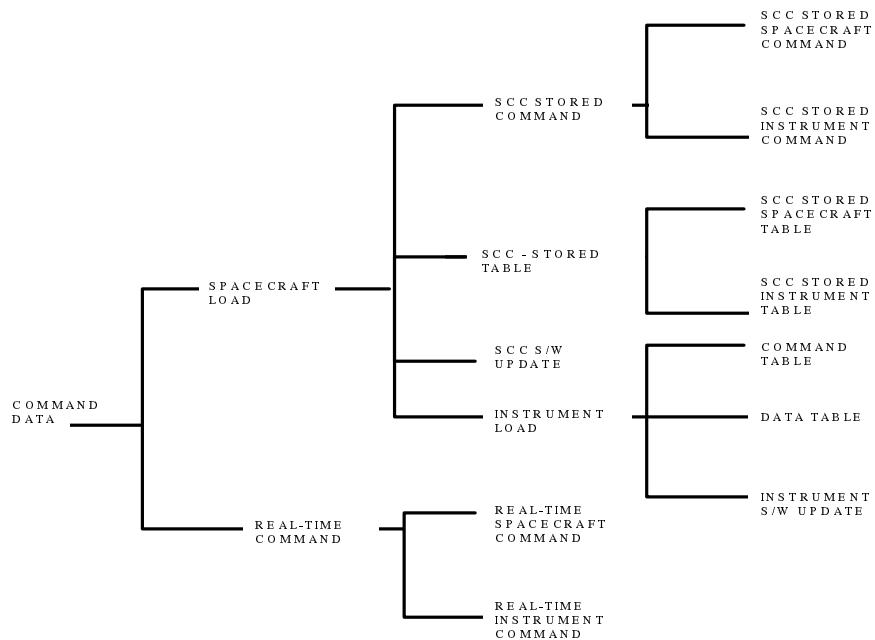
#### Test Case Descriptions:

There are five test cases; the first three correlate to each SN transmission rate (i.e. 125 bps, 1 Kbps, and 10 Kbps). These three test cases are designed along similar scenarios (ECL commands, ECL procedures, Ground Script execution), but the elements are incorporated in differing ways in each test case (varying commands, instruments, size and type of load data, etc). The first three test case scenarios employ a selection of the commanding types illustrated in Exhibit EOC2-4 [based on ref 13, page 3-57].

The fourth test case verifies that the memory dump telemetry from the EOS S/C components and instruments received by the EOC matches the master memory dump images. Detection of discrepancies between images being compared is also verified.

The fifth test case verifies proper Command Operations Protocol-1 (COP-1) processing. FOP initialization (check, nocheck, and unlock), retransmission of commands upon s/c request, and resetting the command counter are exercised.

Test EOC2 performs each type of commanding, as well as, each data rate and uplink path (exhibit EOC2-1), except for the emergency path via GN/WOTS, at 2 Kbps, which will be verified in test EGS2.



**EXHIBIT EOC2-6: Command Data Set Composition**

### **EOC2.1 - 125 bps S-Band Single Access (SSA) Uplink**

This test case incorporates the following features:

- Spacecraft and instrument commanding via SSA at 125 bps.
- Command configuration set to: PLOP=2, CLTUQTY=38, RATE=125, PRIMARY=CTIU-2, CLCW=I
- The Command Activity Controller (CAC) enters real-time commands in the form of ECL directives. Included in the commands are valid, invalid and critical commands.
- The CAC executes ground scripts. Included in the ground scripts are critical commands, command table loads, data table loads, and software updates.
- Overriding of Prerequisite State Check failures.
- Transmit SCC-Stored instrument and spacecraft commands and tables.
- Transmit absolute time command loads and relative time sequence loads.
- Transmit a combination of spacecraft bus and instrument commands to AM-1 instruments.

- Use spacecraft load commands to verify SCC Software Updates and Instrument Loads (Command Table, Data Table, and Instrument S/W Updates). A memory dump of the “load area” is requested and compared to the master ground image
- The CAC examines the returned CLCWs to verify command receipt on the spacecraft.
- Proper transmission, processing, and execution of the commands is verified.

Requirements to be Verified:

EDOS-4.1.1.2#B	EDOS-4.1.1.4#B	EDOS-4.2.1.5#B	EDOS-4.6.1.3#B
EOC-0040#B	EOC-3238#B	EOC-4008#B	EOC-4010#B
EOC-4015#B	EOC-4018#B	EOC-4020#B	EOC-4100#B
EOC-4120#B	EOC-4125#B	EOC-4130#B	EOC-4160#B
EOC-4200#B	FOS-1130#B		

### **EOC2.2 - 1 Kbps S-band Multiple Access (MA) Uplink**

This test case incorporates the following features:

- Spacecraft and instrument commanding via MA at 1 Kbps.
- Command configuration set to: PLOP=2, CLTUQTY=**TBD**, RATE=1000, PRIMARY=CTIU-1, CLCW=Q
- The Command Activity Controller (CAC) enters real-time commands in the form of ECL directives. Included in the commands are proper, improper and critical commands.
- The CAC executes ground scripts. Included in the ground scripts are proper, improper and critical commands.
- Overriding of Prerequisite State Check failures.
- Transmit SCC-Stored commands and tables.
- Transmit a combination of absolute time command loads and relative time sequence loadss some of which require data tables stored in the SCC.
- Transmit a combination of spacecraft bus and instrument commands to AM-1 instruments.
- Use spacecraft load commands to verify SCC Software Updates and Instrument Loads (Command Table, Data Table, and Instrument S/W Updates). A memory dump of the “load area” is requested and compared to the master ground image
- The CAC examines the returned CLCWs to verify command receipt on the spacecraft.
- Proper transmission, processing, and execution of the commands is verified.

Requirements to be Verified:

EDOS-4.1.1.2#B	EDOS-4.1.1.4#B	EDOS-4.2.1.5#B	EDOS-4.6.1.3#B
EOC-0040#B	EOC-3238#B	EOC-4008#B	EOC-4010#B
EOC-4015#B	EOC-4018#B	EOC-4020#B	EOC-4100#B
EOC-4120#B	EOC-4125#B	EOC-4130#B	EOC-4160#B
EOC-4200#B	FOS-1130#B		

### **EOC2.3 - 10 Kbps SSA Uplink**

This test case incorporates the following features:

- Spacecraft and instrument commanding via SSA at 10 Kbps.
- Command configuration set to: PLOP=1, RATE=10000, PRIMARY=CTIU-1, CLCW=I
- The Command Activity Controller (CAC) enters real-time commands in the form of ECL directives. Included in the commands are proper, improper and critical commands.
- The CAC executes ground scripts. Included in the ground scripts are proper, improper and critical commands.
- Overriding of Prerequisite State Check failures.
- Transmit SCC-Stored commands and tables.
- Transmit a combination of absolute time command loads and relative time sequence loads some of which require data tables stored in the SCC.
- Transmit a combination of spacecraft bus and instrument commands to AM-1 instruments.
- Use spacecraft load commands to verify SCC Software Updates and Instrument Loads (Command Table, Data Table, and Instrument S/W Updates). A memory dump of the “load area” is requested and compared to the master ground image
- The CAC examines the returned CLCWs to verify command receipt on the spacecraft.
- Proper transmission, processing, and execution of the commands is verified.

Requirements to be Verified:

EDOS-4.1.1.2#B	EDOS-4.1.1.4#B	EDOS-4.2.1.5#B	EDOS-4.6.1.3#B
EOC-0040#B	EOC-3238#B	EOC-4008#B	EOC-4010#B
EOC-4015#B	EOC-4018#B	EOC-4020#B	EOC-4100#B

EOC-4120#B	EOC-4125#B	EOC-4130#B	EOC-4160#B
EOC-4200#B	FOS-1130#B		

#### **EOC2.4 - Memory Dump Telemetry Processing**

This test case verifies that the memory dump telemetry from the EOS S/C components (CTIU and SCC) and microprocessor of the on-board instruments (except ASTER) received by the EOC matches the master memory dump images.

- EOC is configured for memory dump telemetry processing. The appropriate logical strings are initialized. The dynamic display pages for telemetry, and the event messages and report templates are defined.
- The Binary Load Builder is used to generate a microprocessor load. The load is then uplinked to the ETS MPS as part of a command PROC.
- ETS MPS allows manipulation of the memory data in order to introduce an image discrepancy. An absolute address dump is ordered for the memory location just uplinked.
- EDOS receives telemetry in Channel Access Data Unit (CADU) format from the ETS MPS. It extracts the CCSDS packets and Command Link Control Words (CLCWs). The CCSDS telemetry packets are processed and converted to EDOS Data Units (EDUs) based on the Application Process Identifier (APID) and the Virtual Channel Identifier (VCID), and the replay flag. Memory dump EDUs are sent to the EOC via EBnet using UDP.
- EOC receives the telemetry in EDUs and extracts the dump telemetry data. The data is written out to a dump storage file.
- The memory dump data, and related event and configuration data are forwarded to the FOS DMS for temporary storage then next to the SDPS for permanent archival. The data is maintained at the FOS DMS for a minimum of seven days.
- When the S/C model receives notification from the TLM that a memory dump has been collected and stored with the DMS. S/C model requests that the Ground Image object construct the memory image. Ground Image object receives the raw dump telemetry from DMS, constructs the dump image file, and stores the dump image file with FOS DMS.
- The dump image file is retrieved from DMS along with its master memory dump image. The two image files are compared. An event message that depicts the results of the comparison is forwarded to the FUI for display at the user's workstation. A comparison report is generated and stored with the FOS DMS.
- Another dump is initiated but the flow of telemetry is interrupted to observe timeout processing.

Requirements to be Verified:

EOC-4160#B      EOC-5010#B      EOC-5130#B      EOC-6150#B  
EOC-6160#B

### **EOC2.5 - Command Operations Protocol-1 (COP-1) Processing**

This test case verifies the Frame Operations Procedure (FOP) portion of the COP in order to ensure command frames are received by the spacecraft in sequential order and without duplication or omission.. The FOS ECL directive “FOP” and it’s options (initiate, resume\_ad, transmit, window, vs, timer, timeouttype) will be exercised. The following operations will be performed:

- After setting the FOS sliding window to 10, inhibit receipt of valid CDB by ETS MPS. Upon sending the next command, the command counter mismatch will cause MPS to set the retransmit flag. FOS will resend the entire command queue of 10 commands and the last two will be accepted by MPS.
- The FOS operator will set the number of retransmissions to the maximum value. After transmitting a series of valid commands, setup ETS MPS to reject all future commands. Send FOS CLCW with the retransmit flag set, FOS will continue to retransmit the command queue for the selected number of tries.
- The FOS operator will set the number of transmissions to 1 (no retransmit). The retransmit flag will be sent to FOS by MPS. FOS should not retransmit any commands.
- Initialize FOP by synching the spacecraft command counter to the ground (FOP INIT). Verify command counters in synch and commands are successfully transmitted.
- ETS MPS set Lockout flag in CLCW. Initialize FOP by sending a type B command to clear the Lockout flag (FOP INIT UNLOCK). Send commands and monitor the command counters, CLCW Report Value, and CLCW Farm B counter for proper operation. Verify command counters in synch and commands are successfully transmitted.
- Disable telemetry flow from MPS to EOC and set the FOS and MPS command counters out-of-synch. Initialize FOP to ignore command synch (FOP INIT NOCHECK). Monitor command data and command counters for proper operation.
- Set the FOS timeout type to suspend, the FOP Timer to a minimum value, and inhibit CLCW transmission from MPS. Send a valid command and after the appropriate time observe the proper system response.

Requirements to be Verified:

EOC-4010#B      EOC-4120#B

Test Procedures:

**Test Set-up:**

Step	Station	Action	Expected Results	Comments
1.	EOC	If the Data Server ( <b>DS</b> ) and Real Time Server ( <b>RTS</b> ) are running, skip to step 21 to start a User Work Station ( <b>UWS</b> ).		
2.	EOC	Log onto an EOC console (msseoc2) as <b>IWTEST</b> . Enter password.	UNIX Terminal window(s) open. Preferably bring up the Data Server and Real Time Server on a console that will not be used as a user workstation during the test.  Note: Startup and shutdown procedures can be found in the Operations Tools Manual page 4-3. Use of msseoc2 is for consistency; operationally it will be used for LSM not as a Userstation.	
3.	EOC	Open SUN workstation room 2 (of 4). Click on button labeled <b>Two</b> .	UNIX Terminal window(s) open. Note: Use of 2 <sup>nd</sup> & 3 <sup>rd</sup> rooms are for organizational purposes only, it is not a required configuration.	Open a UNIX terminal window if none open.
4.	EOC	Bring up the FOS Homepage on Netscape: <b>netscape</b>	FOS Database Access Page displayed. If not automatically displayed, check Netscape for a bookmark. If no bookmark enter the url: <b>http://198.118.199.20/FosDbHome.html</b>	
5.	EOC	Verify no endpoints exist: Click on <b>NAMESERVER Database</b> Click on <b>Clear Form</b> Click on <b>Submit</b> .	“Total matches = 0”. Note: If any endpoints exist watch for live processes/endpoints on the Data Server, Real Time Server, and on User Stations in the following steps. They must all be removed/killed prior to system startup.	

Step	Station	Action	Expected Results	Comments
6.	EOC	Open SUN workstation room 3 (of 4). Click on button labeled <b>Three</b> .	UNIX Terminal window(s) open. Note: Use of 2 <sup>nd</sup> & 3 <sup>rd</sup> rooms are for organizational purposes only, it is not a required configuration. Also, Data Server and Real Time Server may be started from different consoles.	Open two UNIX terminal windows if none open.
7.	DS	Remote login to the Data Server (fosec7): <b>rlogin foseoc7</b> enter your "password" (used in step 1)	Successful login to Data Server.	
8.	DS	Change directory and check for live processes. <b>test</b> (or <b>cd /fos/test/am1/scripts/setup</b> ) <b>ps -ef</b>	Current processes will be displayed along with owner. Note: "ps -ef" truncates the process path/name. Use "ps -ax" to see process name.	Path may be aliased as "test"
9.	DS	Kill all undesirable processes - Processes with a /fos/test/am1/bin/... prefix and owner is not "root" (there may be others). Initially, as process owner, use <b>MyKill</b> to shutdown the process. If processes are still active use <b>kill -USR1 "pid"</b> for each active process, then use <b>kill -9 "pid"</b> for each undesirable process. Type <b>ps -ef</b> again to verify.	Notes: "kill -USR1" saves data created since the Data Server was brought up. Use "kill -9" only after "kill -USR" on the Data Server or Real Time Server; or data may be lost. The user may need to be logged in as the owner of the processes in order to kill them.	
10.	RTS	From the 2 <sup>nd</sup> UNIX window in room 3, remote login to the Real Time Server (fosec6): <b>rlogin foseoc6</b> enter your "password" (same as in step 1)	Successful login to Real Time Server.	
11.	RTS	Change directory and check for live processes. <b>test</b> (or <b>cd /fos/test/am1/scripts/setup</b> ) <b>ps -ef</b>	Current processes will be displayed along with owner and process id.	

Step	Station	Action	Expected Results	Comments
12.	RTS	Kill all undesirable processes - Processes with a <code>/fos/test/aml/bin/...</code> prefix Initially, as process owner, use <b>MyKill</b> to shutdown the process. If processes are still active use <b>kill -USR1 &lt;pid&gt;</b> for each active process, then use <b>kill -9 &lt;pid&gt;</b> for each undesirable process. Type <b>ps -ef</b> again to verify.		
13.	DS	At the Data Server (fosec7), source the A2_DataServerStartup shell script from directory: <code>/fos/test/aml/scripts/setup</code> . <b>source A2_DataServerStartup</b>	The script will take 1-5 minutes to complete.	
14.	DS	Observe in the UNIX window: “Successful installation of signal handler FpLqSigHand”, and repeating “Waiting for activity”,	If this message is not displayed, first wait a little longer, while waiting check the number of processes on the Data Server via netscape (next step). Most likely cause of failure is the presence of processes/endpoints prior to startup of Data Server.	
15.	EOC	From Netscape in SUN workstation room 2, verify that 14 endpoints are now found by submitting a blank form. <b>Back</b> <b>Submit</b>	The number of endpoints found is 14. Using “ <b>ps -ax</b> ” 18 processes are active. If the number of endpoints does not equal 14, be sure startup has completed, if so, use <b>MyKill</b> to clean out <u>all</u> processes. Restart from step 4.	

Step	Station	Action	Expected Results	Comments
16.	RTS	At the Real Time Server (foseoc6) in SUN workstation room 3, source the A2_RealTimeServerStartup shell script from directory: /fos/test/am1/scripts/setup. <b>source A2_RealTimeServerStartup</b>	The script will take 2- 5 minutes to complete.	
17.	RTS	Observe in the UNIX window: “DECOM IS READY TO RECEIVE I CHANNEL PACKETS...” and “DECOM IS READY TO RECEIVE Q CHANNEL PACKETS...”	Note: The DECOM messages will appear several times, wait until they appear on two consecutive lines. There should not be any ‘FORMAT Problem: xxx -socket error’. This is an indication that endpoints existed prior to startup.	
18.	EOC	From Netscape in the SUN workstation room 2, verify that 49 endpoints are now found by submitting a blank form. <b>Back</b> <b>Submit</b>	The number of endpoints found is 49. If the number of endpoints does not equal 49, be sure startup has completed, if so, use <b>MyKill</b> to clean out <u>all</u> Real Time Server (RTS) processes. Use Netscape with “foseoc6” in the “Entry ID” field to verify 0 endpoints on RTS. Use “ps -ef” to check for undesirable processes. Restart RTS.	
19.	EOC	Leave Data Server and Real Time Server windows open to view statuses.		
20.	EOC	If the console will be used as a User workstation, close Netscape.	Warning: Netscape and the Event_Display window can not be open at the same time (12/05/96).	

Step	Station	Action	Expected Results	Comments
21.	UWS	Log onto an EOC User Work Station (preferably non-msseoc2). Enter your user name. Enter your password.	UNIX Terminal window(s) open. Note: The User station can be brought up at the same time as the Real Time Server. However this makes the endpoint count via Netscape a bit more difficult for use to double-check proper startup. Patience is a virtue.	
22.	UWS	Change directory and check for live processes. <b>test</b> (or <b>cd /fos/test/am1/scripts/setup</b> ) <b>ps -ax</b>	Current processes will be displayed along with owner. There should be no undesirable processes. If so, run MyKill as owner of processes. 'Kill -9' is a last resort.	Use "ps -ax" on SUN.
23.	UWS	Source the A2_UserStationStartup shell script from directory: /fos/test/am1/scripts/setup. <b>source A2_UserStationStartup</b>	The script will take 3 - 5 minutes to complete. The following six planning and scheduling windows will open: -Load Generator -Activity Definer -BAP Definer -Load_Manager -EOS Timeline -General Scheduler.	A Control Window will open last. Netscape endpoint count at this point is 57.

Step	Station	Action	Comments
Expected Results			
24.	UWS	Iconify the 6 planning and scheduling windows.	If there are not 6 planning and scheduling icons and the Control Window, first wait a little longer; while waiting check the number of processes on the user station via netscape (enter console name in "Entry ID" field. Correct number of user station endpoints is 8 ?)
		If unsuccessful startup, type <b>MyKill</b> , in user Station's UNIX window, kill undesirable processes, and restart user station only. If still unsuccessful call for help, you'll probably perform a complete shutdown and restart!	
25.	UWS	Bring up Event_Display window. Click on "Tools..." button in Control Window, select <b>Event_Display</b> , and <b>OK</b> .	Event_Display may take a few minutes to appear.
		Issue the ECL directive to connect to string 100: <b>STRING CONNECT STRING=100 TLMTY PE=ALL CONFIG=MIRROR</b>	Event message: "Successfully connected to String 100." Approximately a 7 minute wait.
26.	UWS	From a UNIX window, different from the window used for User startup, run the SI&T userstation configuration recording script: <b>/home/ivvtest3/scripts/testconfig.scr</b>	This can be done while waiting for the string to connect! Creates a file called testconfig.
27.	UWS	Record the system configuration on the execution cover sheet. (FOS Version #, EDO\$ V#, patches, etc)	System configuration recorded (while waiting for the string to connect).
28.	UWS	Enable telemetry data archiving.	An event message stating that telemetry archiving is enabled.
29.	UWS	The ECL directive <b>ARCHIVE</b> will control the archiving modes: <b>ARCHIVE TLM =ENABLE &lt;thm TYPE&gt;</b>	

### Test Execution:

#### EOC2.1 125 bps S-Band Single Access (SSA)

*Set command configuration to: PLOP=2, CLTUQTY=38, RATE=125, PRIMARY=CTIU-2, CLCW=I*

**FOR REVIEW PURPOSES** - The procedures for EOC2.1 will follow the same general outline as EOC2.3, however, the ECL commands, and ECL Procedures will differ from EOC2.2 and EOC 2.3. The Detailed Activity Schedule will be identical to EOC2.2 and EOC2.3 to verify performance consistencies.

#### EOC2.2 1 kbps S-Band Multiple Access (SMA)

*Set command configuration to: PLOP=2, CLTUQTY=TBD, RATE=1000, PRIMARY=CTIU-1, CLCW=Q*

**FOR REVIEW PURPOSES** - The procedures for EOC2.2 will follow the same general outline as EOC2.3, however, the ECL commands, and ECL Procedures will differ. The Detailed Activity Schedule will be identical to EOC2.1 and EOC2.3 to verify performance consistencies.

#### EOC2.3 10 kbps S-Band Single Access (SSA)

##### Summary of EOC2.3

*Set command configuration to: PLOP=1, RATE=10000, PRIMARY=CTIU-1, CLCW=I*

**Execute, in real time, a Detailed Activity Schedule (DAS) *created in EOC3***

*allow a critical command*

*cancel a critical command*

*Upon detection of a predefined emergency/contingency situation; suspend Ground Script*

*Execute a PROC with SC and Instr commands*

*insert an invalid command during ground script execution*

*Resume Ground Script*

*cancel a prerequisite state failure*

*override a prerequisite state failure*

*RTS Load,*

*Table Load,*

*SCC s/w Load ?*

- .....
- verify cmd transmission & format (post test analysis)*
- Send 3 individual commands (ECL command line)*
- [EOC2.2] -Setup to send a 4<sup>th</sup> command with 4 tlm points for PSC (CV passed or off, and TV passed or off)*
- Status 2 of the 4 PSCs to pass - command not sent*
  - Status 3 of the 4 PSCs to pass - command not sent*
  - Status 4 of the 4 PSCs to pass - command sent*
- [EOC2.3] -Setup to send command with 4 tlm points for PSC (CV passed or off, and TV passed or off) (same cmd as EOC2.2)*
- Set PSC to OFF*
- Status 2 of the 4 PSC s to pass*
- send cmd - command sent*
- Send a command entered in binary (hex) format*
- Ensure operator confirmation required*
- Confirm sending of command*
- verify CLCW indicates successful cmd receipt by s/c*
- verify tlm status to verify successful cmd execution onboard s/c*
- verify cmd transmission & format (post test analysis)*
- Execute ECL PROC containing 5 commands.*
- confirm critical command*
- override range check*
- verify transmission & format*
- verify CLCW indicates successful cmd receipt by s/c*
- verify tlm status to verify successful cmd execution onboard s/c*
- Execute ECL PROC containing **ATC** Load*
- Load*
- verify CLCW indicates successful receipt by s/c*
- Dump, Compare*
- Enable, Select, Activate*
- verify tlm status to verify successful cmd execution onboard s/c*
- Disable*

*Execute ECL PROC containing Table Load*

*Load*

*verify CLCW indicates successful receipt by s/c*

*Dump, Compare*

*Enable, Select, Activate*

*verify tlm status to verify successful cmd execution onboard s/c*

*Disable*

*Execute ECL PROC containing: 20 Critical commands, 20 commands with Prerequisite States, 20 commands with Execution Verification, and 20 commands with Variable Data Words (submnemonics); based on the FOS PDB. (Different commands for EOC2.1, 2.2, and 2.3).*

*verify CLCW indicates successful cmd receipt by s/c*

*verify tlm status to verify successful cmd execution onboard s/c*

*Attempt to send variety of invalid commands:*

*command with misspelled mnemonic (valid otherwise)*

*command with misspelled submnemonic (valid otherwise)*

*command with submnemonic above max\_value (positive value)*

*command with submnemonic below min\_value (positive value)*

*command with submnemonic above max\_value (negative value)*

*command with submnemonic below min\_value (negative value)*

*command with submnemonic negative value, (absolute value would be within range)*

*command with valid values for submnemonics, but no submnemonic names*

*command missing required submnemonic*

*Send valid command missing **non-required** submnemonics - verify default values used*

*verify CLCW indicates successful cmd receipt by s/c*

Step	Station	Action	Expected Results	Comments
1.	EOC	In a UNIX terminal other than where user station was started, <b>cd /fos/test/am1/reports</b> <b>ll -atr</b>	The list of report files includes: cdb.dat and cdb.nrz.	
2.	EOC	“Clear out” the two report files: cdb.dat and cdb.nrz. If cdb.dat file size is not zero (i.e. commands have been sent prior to this test), the Real Time Server must be brought down and restarted. Follow directions in the Startup procedures.	Cdb.dat file size is zero or small enough not to hinder post test analysis.	For post test analysis, only want commands from this test.
3.	CAC	Configure the control center for SN SSA service via the AM1 HGA antenna. In the Control Window’s ECL commandline, enter: <b>CMDCFG PREREQUISITE=ENABLE</b> <b>PLOP=1 ANT=HGA CHAN=SSA PRIM=1</b>	Path configuration accepted. Event_Display status message reflects change.	EOC4200
4.	MPS	Bring up and configure ETS MPS for receiving commands at 10kbps and to transmit 16k HK telemetry to EOC.		
5.	~	Make a Detailed Activity Schedule (DAS), to run in approximately 45 minutes.	DAS times modified to run approximately 45 minutes from current time.	
6.	EOC	Restore the Timeline window, click on File menu item, select Open.	Open Plan window is displayed	
7.	EOC	Select the Master Plan, enter current GMT time for Start time. Enter current time + 2 hours for Stop time. Format is: <b>1997/"DOY"</b> <b>00:00:00 Click OK</b>	Timeline for the 1997 time range selected is displayed	DOY=Day Of Year

Step	Station	Action	Expected Results	Comments
8.	EOC	In the EOC Master Timeline window: <b>select User Setup,</b> <b>select Resources,</b> In the EOS Timeline window, highlight <b>AM1 Guidance Nav &amp; Control</b> in the Available Resources box, click <b>Add</b> , click <b>Apply</b> .	Adds AM1 Guidance Nav & Control to Timeline resources.	
9.	EOC	In Viewed Resources, highlight <b>AM1 MISR</b> , click the “up” arrow to the top of the page, highlight <b>AM1 MOPITT</b> , click the “up” arrow to underneath <b>AM1 MISR</b> , highlight <b>Guidance Nav &amp; Control</b> , click the “up” arrow to underneath <b>MOPITT</b> , click <b>OK</b> .	The first 3 groups in the timeline are MISR, MOPITT, and Guidance & Nav Control.	
10.	EOC	Open the General Scheduler window, select <b>AM1 MISR</b> , highlight <b>EOC3_MISR_ACT_1_FR</b> . From the Open Plans List select <b>Master Plan</b> . Enter current time + 45 minutes for Start time. Enter current time + 55 minutes for Stop time. Format is: <b>1997"DOY" 00:00:00</b> .	DOY=Day of Year	
11.	EOC	In the General Scheduler window, ensure <b>Impact</b> icon selected, click on <b>Schedule</b> icon.	MISR schedule appears on timeline.	

Step	Station	Action	Comments
Step	Station	Expected Results	
12.	EOC	<p>In the General Scheduler window, select <b>AMI MOPITT</b>, highlight <b>EOC3_MOPITT_ACT_1_FR</b>. Enter current time + 60 minutes for Start time. Enter current time + 65 minutes for Stop time. Format is: <b>1997"DOY" 00:00:00</b>.</p>	DOY=Day of Year
13.	EOC	<p>In the General Scheduler window, ensure <b>Impact</b> icon present, click on <b>Schedule</b> icon.</p>	
14.	EOC	<p>In the <b>General Scheduler</b> window, select <b>AMI Guidance Nav &amp; Control</b>, highlight <b>EOC3_GNC_ACT_1_FR</b>. From the Open Plans List select <b>Master Plan</b>. Enter current time + 70 minutes for Start time. Enter current time + 80 minutes for Stop time. Format is: <b>1997"DOY" 00:00:00</b>.</p>	DOY=Day of Year
15.	EOC	<p>In the General Scheduler window, ensure <b>Impact</b> icon present, click on <b>Schedule</b> icon.</p>	Guidance Nav & Control schedule appears on timeline.
16.	EOC	<p>Iconify the General Scheduler and Timeline windows.</p>	Windows iconized.

Step	Station	Action	Expected Results	Comments
17.	EOC	<p>Restore the Load_Generator window.</p> <p>Enter a DAS ID of today's DOY,</p> <p>enter DAS Start time of today at 5 minutes prior to start of MISR time.</p> <p>enter DAS Stop time of today at 5 minutes after end of Guidance Nav &amp; Control time.</p> <p>enter Uplink Start and Stop time of yesterday from 00:00:00 to 01:00:00</p> <p>Click <b>OK</b>.</p>	<p>Event_Display message of: Complete SUCCESSFUL processing of DAS#"DOY"</p> <p><b>Record times:</b>  <b>DAS start:</b> _____  <b>DAS stop:</b> _____</p>	
18.	EOC	Iconify Load_Generator window.		
19.	CAC	In the C_W window, take command authority. <b>TAKE COMMAND STRING=100</b>	In Event_Display observe message that command authority has been assigned.	
20.	CAC	Click on <b>Tools...</b> button	Tools menu displayed.	
21.	CAC	Double-click on <b>Command Control</b> line.	CCW/CMW window is displayed	
22.	CAC	In the CCW/CMW window enter: <b>100</b> for String ID, <b>AM1</b> for Spacecraft ID.	Command Control Window (CCW) is displayed, not Command Monitor Window.	
		Click <b>OK</b> .		
23.	CAC	Resize the Command Control Window. Lengthen the Status field.	Statuses in the STATUS field can be seen when script is resumed.	
24.	CAC	Ensure Mode is set to Auto, if not: In the CCW menu, click on <b>Config</b> , Click the <b>Auto</b> button	On CCW upper status bar: Status of Mode is Auto (default)	
25.	~	Execute, in real time, an existing ground script.		
26.	CAC	In the CCW, under the <b>File</b> option, select <b>Open</b> .	Pair Time Selector window opens.	

Step	Station	Action	Expected Results	Comments
27.	CAC	Press <b>enter</b> after each of the following field entries. Enter the same start date and time, and stop date and time as the DAS.	New start/stop date and time displayed by the “Absolute Start Time;” and “Absolute Stop Time”.	The script is defined to run within the next half hour.
28.	CAC	In the Pair Time Selector window: Click <b>OK</b> .	Ground script ready for execution. Verify ground script configured and commands are specified as desired.	
29.	CAC	Turn off CV and TV. In the CCW menu, click on <b>Config</b> , Click the <b>Cmd Verification</b> button Click on <b>Config</b> .	On CCW upper status bar: Status of CV is Off, Status of TV is Off	
30.	CAC	Click the <b>Tim Verification</b> button.		
31.	CAC	Print the ground script. In the menu bar select <b>File</b> , select <b>Print</b> .	The ground script is printed on the printer.	
32.	CAC	Print the CCW. Type <b>smapframe</b> in a UNIX window, and click in the CCW.	The CCW is printed.	
33.	CAC	Click on <b>Resume</b> button to start ground script execution.	Ground script begins execution; status is “Active”.	
34.	CAC	Monitor the ground script as commands are transmitted.	Commands are activated at correct times.	
35.	CAC	At critical command confirmation, click <b>Allow</b> button.	Critical command is transmitted after operator “allows” it.	EOC4100
36.	CAC	Observe command uplink message event messages.	Event messages reflect critical command sent.	EOC4140
			Ground script status is “Suspended”.	

Step	Station	Action	Expected Results	Comments
37.	CAC	Enter a valid critical ECL command in the CCW.  /CEF_SET_INSTR_RESET  Press <b>enter</b>  Click <b>Resume</b>  Click <b>Send</b>  Click <b>Allow</b> .	Command transmitted within 1 minute of detection of predefined emergency/ contingency situation.  Message displayed indicating command sent.	EOC-3238#B  pid 1254, 32FH
38.	CAC	Enter an invalid critical ECL in the CCW and press enter (use zeros vice Os).  /EAS_ARM_HGA_B00MA	Message displayed indicating command error.	cmd_pid 605
39.	CAC	Click <b>OK</b> .  Click on <b>Resume</b> button to restart ground script execution.	Ground script begins execution; status is “Active”.	
40.	CAC	Upon message to the operator indicating a prerequisite state failure, click the <b>Cancel</b> button.	Command is canceled, not transmitted.	
41.	CAC	Upon message to the operator indicating a second prerequisite state failure, click the <b>Override</b> then the <b>Resume</b> buttons.	Command is transmitted.	
42.	CAC	Observe ground script execution completion.	Status display indicates all commands processed.	
43.	ETS	Verify command transmitted by EOC and received by ‘EDOS’ . “Save” command(s) as transmitted in a file for post-test analysis.	Commands received in proper format and transmission rate =10 Kbps.	Off-line analysis to verify CCSDS conformance.
44.	~	Set processing mode to Step, send 3 individual valid commands; confirm receipt.		

Step	Station	Action	Expected Results	Comments
45.	CAC	Set Mode to Step: In the CCW menu, click on <b>Config</b> , Click the <b>Step</b> button	On CCW upper status bar: Status of Mode is Step.	
46.	CAC	Suspend execution of the ground script. <b>Click Suspend.</b>	Resume button is enabled.	
47.	CAC	Enter the following single valid spacecraft command on the ECL command line: <b>/CDH_DISABLE_CTLVIF</b> Press Enter.	Text displayed in DIRECTIVE area of CCW.	Cmd type: #2281 ERT Serial/ CTIU1
48.	CAC	Enter the following single valid spacecraft command on the ECL command line: <b>/MOD_SET_SR_MTR_GRP GR=61200</b> <b>SL=0 WH=5</b> Press Enter.	Text displayed in DIRECTIVE area of CCW.	Cmd type: #1475 ERT Serial MODIS
49.	CAC	Enter the following single valid spacecraft command on the ECL command line: <b>/EPS_SET_ADEA_RATEADJ</b> <b>ADJUSTMENT=-255</b> Press Enter.	Text displayed in DIRECTIVE area of CCW.	Cmd type: #1552 BDU Serial CMD C&DH/COMM BDU
50.	CAC	<b>Click Resume.</b>	“Send/Cancel” displayed in STATUS field of first command. STATUS field flashes.	
51.	CAC	<b>Click Send</b>	/CDH_DISABLE_CTLVIF is processed. Event_Display messages reflect correct command and sequence number.	
52.	CAC	After first command is processed: <b>Click Send</b>	/MOD_SET_SR_MTR_GRP GR=61200 SL=0 WH=5 is processed. Event_Display messages reflect correct command and sequence number.	

Step	Station	Action	Expected Results	Comments
53.	CAC	After second command is processed: <b>Click Send</b>	/EPS_SET_ADEA_RATEADJ ADJUSTMENT=-255 is processed. Event_Display messages reflect correct command and sequence number.	
54.	EDOS	Verify commands transmitted by EOC and transferred by EDOS to spacecraft.	Transmission rate =10 Kbps (per EDOS analyzer - BERT). Command received in proper format.	Off-line analysis to verify CCSDS conformance.
55.	EOC	Verify CLCW received indicating valid command received by spacecraft.	CLCW counter increments (Report V value), appropriate fields reflect receipt of valid command (Retransmit Flag=0).	' End-item-verifier EOC4125
56.	~	Verify via telemetry, command execution on-board the spacecraft		
57.				
58.	~	Execute an ECL procedure to send 5 valid commands (s/c & instr), confirm transmission.		
59.	CAC	Suspend the Ground Script execution: In the CCW lower selection bar, click <b>Suspend</b> .	Resume is highlighted.	
60.	CAC	Execute the existing ECL procedure EOC23_5CMDS. <b>START EOC23_5CMDS</b> Press Enter	EOC23_5CMDS is displayed in DIRECTIVE area of CCW.	
61.	CAC	<b>Click Resume.</b>	“Send/Cancel” displayed in STATUS field of PROC name. STATUS field flashes.	
62.	CAC	For the PROC, click <b>Send</b>	PROC text is loaded into ground script field and displayed in DIRECTIVE area of CCW. “Send/Cancel” displayed in STATUS field of first command.	

Step	Station	Action	Expected Results	Comments
63.	CAC	For each command - click <b>Send</b>	Command processed. Event_Display messages reflect correct command and sequence number.	
64.	CAC	If necessary, click override for any Prerequisite State Check failures.	Command processed. Event_Display messages reflect correct command and sequence number.	
65.	CAC	At critical command confirmation, click <b>Allow</b> .	Critical command is transmitted after operator “allows” it.	
66.	CAC	Observe command uplink message event messages.	Event messages reflect command activity.	EOC4140
67.	EDOS	Verify command transmitted by EOC and received by EDOS.	Transmission rate =10 Kbps (per EDOSS analyzer - BERT). Command received in proper format.	Off-line analysis to verify CCSDS conformance.
68.	CAC	Save Event_Display data in ivvttest4 directory. (fill in current “date”) In Event_Display menu: Select <b>File</b> , select <b>Save As</b> , enter <b>/home/ivvttest4/ EOC23_EVTDIS_“date”.STEP67</b>	File saved in ivvttest4 directory.	
69.	EOC	In a UNIX terminal other than where user station was started, <b>cd /fos/test/am1/reports ll -atr</b>	The list of log files includes: cbd.dat and cdb.nrz.	
70.	EOC	Perform a hex dump to analyze files. <b>od -x cbd.dat   lp</b>	cdb.dat file is printed in hex.	

Step	Station	Action	Expected Results	Comments
71.	EOC	Copy command archive files for future reference. (fill in current “date”) <b>cp cdb.dat /home/ivvtest4/ EOC23_CDBDAT_”date”STEP70 cp cdb.nrz /home/ivvtest4/ EOC23_CDBNRZ_”date”STEP70</b>	cdb.dat copied to ivvtest4 directory.	
72.	~	Verify via telemetry the receipt of the 5 commands by the s/c and instruments.	cdb.nrz copied to ivvtest4 directory. CLCW counter increments (Report Value), appropriate fields reflect receipt of valid command (Retransmit Flag=0).	^ CLCW processing
73.	~	Verify via telemetry s/c and instrument command execution on-board the spacecraft		^ End-item-verifier EOC4125
74.	~	Execute an ECL procedure to send 5 sets of 64 valid commands (s/c & instr) in quick succession, confirm transmission.		
75.		Execute the existing ECL procedure <b>EOC23_5X64CMDS. START EOC23_5X64CMDS Press Enter</b>	EOC23_5X64CMDS is displayed in DIRECTIVE area of CCW.	
76.	CAC	Click <b>Resume</b> .	“Send/Cancel” displayed in STATUS field of PROC name. STATUS field flashes.	
77.	CAC	For the PROC, click <b>Send</b>	PROC text is loaded into ground script field and displayed in DIRECTIVE area of CCW. “Send/Cancel” displayed in STATUS field of first command.	
78.	CAC	For the first 10 commands - click <b>Send</b>	Command processed. Event_Display messages reflect correct command and sequence number.	

Step	Station	Action	Expected Results	Comments
79.	CAC	Suspend ground script and set Mode to Auto: <b>Click Suspend.</b> In the CCW CMD line enter: <b>MODE AUTO.</b> <b>Press Enter</b> <b>Click Resume.</b>	On CCW upper status bar: Status of Mode is Auto. Commands in Ground script process automatically, without Send/Cancel prompt.	
80.	CAC	At any critical command confirmation, click <b>Allow.</b>	Critical command is transmitted after operator “allows” it.	
81.	CAC	Observe command uplink message event messages.	Event messages reflect command activity.	EOC4140
82.	EDOS	Verify command transmitted by EOC and received by EDOS.	Transmission rate =10 Kbps (per EDOSS analyzer - BERT). Command received in proper format.	Off-line analysis to verify CCSDS conformance.
83.	~	Verify via telemetry the receipt of the 5x64 commands by the s/c and instruments.	CLCW counter increments (Report V value), appropriate fields reflect receipt of valid command (Retransmit Flag=0).	^ CLCW processing
84.	~	Verify via telemetry s/c and instrument command execution on-board the spacecraft		^ End-item-verifier EOC4125
85.	~	Execute an ECL procedure to send 80 valid commands of varying types, confirm transmission.		20 Critical, 20 PSC, 20 Exec Verifctn, 20 w/submnemon
86.	ETS	Initiate Housekeeping telemetry to EOC.	Telemetry being received by EOC.	<a href="#">MPS scenario file:</a>
87.		Execute the existing ECL procedure <b>EOC23_4X20CMDS.</b> <b>START EOC23_4X20CMDS</b> <b>Press Enter</b>	EOC23_4X20CMDS is displayed in DIRECTIVE area of CCW.	

Step	Station	Action	Expected Results	Comments
88.	CAC	Click <b>Resume</b> .	“Send/Cancel” displayed in STATUS field of PROC name. STATUS field flashes.	
89.	CAC	For the PROC, click <b>Send</b>	PROC text is loaded into ground script field and displayed in DIRECTIVE area of CCW. “Send/Cancel” displayed in STATUS field of first command.	
90.	CAC	At each critical command confirmation, click <b>Allow</b> .	Critical command is transmitted after operator “allows” it. Event_Display messages reflect correct command and sequence number.	
91.	CAC	Observe command uplink message event messages.	Event messages reflect command activity.	EOC4140
92.	CAC	At each WAIT, click <b>GO</b> .	Ground Script waits at each WAIT, then continues and selecting GO.	
93.	EDOS	Verify command transmitted by EOC and received by EDOS. Save command as transmitted in a file for post-test analysis.	Transmission rate =10 Kbps (per EDOSS analyzer - BERT). Command received in proper format.	Off-line analysis to verify CCSDS conformance.
94.	~	Verify via telemetry the receipt of the commands by the s/c and instruments.	CLCW counter increments (Report Value), appropriate fields reflect receipt of valid command (Retransmit Flag=0).	* CLCW processing
95.	~	Verify via telemetry s/c and instrument command execution on-board the spacecraft		* End-item-verifier EOC4125
96.	~	Attempt to send a variety of invalid commands (s/c & instr), confirm detection of error.		Verify command validate process' g
97.	CAC	On the ECL command line enter the following command with misspelled mnemonic: <b>/GNC_DISABLE_STICALIP</b> Press <b>Enter</b> .	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	cmd_pid 2061 ST1CALIP

Step	Station	Action	Expected Results	Comments
98.	CAC	On the ECL command line enter the following command with misspelled submnemonic: <b>/TCS_SET_PBATPWMB DUTYCYCLE=255 NTRGROUP=0</b>	Command displayed in Ground script.	cmd_pid 1657 HTRGROUP
99.	CAC	Attempt to send command with invalid submnemonic. Click <b>Resume</b> . click <b>Send</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	Ground script is suspended.
100.	CAC	Resume ground script. Click <b>Resume</b> .	Suspend button is enabled.	
101.	CAC	On the ECL command line enter the following command with submnemonic above max_value (positive value): <b>/MOD_SET_FR_RAM_XFER TO=606178</b>	Command displayed in Ground script.	cmd_pid 1377 max is 606176.0
102.	CAC	Attempt to send command with invalid submnemonic. Click <b>Resume</b> . click <b>Send</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	
103.	CAC	Resume ground script. Click <b>Resume</b> .	Suspend button is enabled.	
104.	CAC	On the ECL command line enter the following command with submnemonic below min_value (positive value): <b>/CDH_DUMP_CT1GATHER RTNAME=544</b>	Command displayed in Ground script.	cmd_pid 2327 min is 545.0
		Press <b>Enter</b> .		

Step	Station	Action	Expected Results	Comments
105.	CAC	Attempt to send command with invalid submnemonic. <b>Click Resume.</b> click <b>Send</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	
106.	CAC	Resume ground script. <b>Click Resume.</b>	Suspend button is enabled.	^if defined
107.	CAC	On the ECL command line enter the following command with submnemonic above max_value (negative value): /		
108.	CAC	On the ECL command line enter the following command with submnemonic below min_value (negative value): <b>/GNC_SET_ST2FIELDSRCH_YRATE=-128</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	cmd_pid 1883 min is -127 (max is 128)
		Press <b>Enter</b> .		
109.	CAC	Attempt to send command with invalid submnemonic. <b>Click Resume.</b> click <b>Send</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	
110.	CAC	Resume ground script. <b>Click Resume.</b>	Suspend button is enabled.	
111.	CAC	On the ECL command line enter the following command with submnemonic negative value (absolute value would be within range): <b>/MOD_SET_PVVIS_ECAL_TO=-0.1</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	cmd_pid 1369 valid 0 - 1
		Press <b>Enter</b> .		

Step	Station	Action	Expected Results	Comments
112.	CAC	Attempt to send command with invalid submnemonic. <b>Click Resume.</b> click <b>Send</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	
113.	CAC	Resume ground script. <b>Click Resume.</b>	Suspend button is enabled.	
114.	CAC	On the ECL command line enter the following command with valid submnemonic values, but no submnemonic names: <b>/CDH_SET_CTR2_CLK 32768 67108864 512</b> <b>Press Enter.</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	cmd_pid 2514
115.	CAC	On the ECL command line enter the following command missing a required submnemonic : <b>/TBD</b> <b>Press Enter.</b>		
116.	CAC	On the ECL command line enter the following command missing a <b>non-required</b> submnemonic: <b>/AST_SET_S_PULSE PULSE=128</b> <b>Press Enter.</b>	Event display indicates command transmitted with default submnemonic value. Post test analysis of CDB.dat will be performed to verify submnemonic values.	cmd_pid 1940 submnemonics: PARITY PULSE
117.	CAC	Attempt to send command with invalid submnemonic. <b>Click Resume.</b> click <b>Send</b>	Error message indicates correct cause of command failure and provides information to the operator for diagnosing error.	
118.	CAC	Verify Command was sent with correct submnemonics	PARITY=default, PULSE=128	Offline analysis.

Step	Station	Action	Expected Results	Comments
119.	CAC	Clear out Ground Script commands. Click <b>Suspend</b> , click <b>Kill</b> , click <b>OK</b> .	Ground script is cleared out.	
120.	CAC	Close out CCW. Click <b>File</b> , select <b>Quit</b> , click <b>OK</b> .	Command Control Window closes.	
121.	CAC	Save Event_Display data in ivvtest4 directory. (fill in current “date”) In Event_Display menu: Select <b>File</b> , select <b>Save As</b> , enter <b>/home/ivvtest4/evtdis.”date”_eoc23</b>	File saved in ivvtest4 directory.	
122.	EOC	In a UNIX terminal other than where user station was started, <b>cd /fos/test/am1/reports</b> <b>ll -atr</b>	The list of log files includes: cdb.dat and cdb.nrz.	
123.	EOC	Perform a hex dump to analyze files. <b>od -x cdb.dat   lp</b>	cdb.dat file is printed in hex.	
124.	EOC	Copy command archive files for future reference. (fill in current “date”) <b>cp cdb.dat</b> <b>/home/ivvtest4/cdbdat.”date”_eoc23</b> <b>cp cdb.nrz</b> <b>/home/ivvtest4/cdbnrz.”date”_eoc23</b>	cdb.dat copied to ivvtest4 directory. cdb.nrz copied to ivvtest4 directory.	
125.	~	Verify via telemetry that only the valid command was received by the s/c or instruments.		^CLCW EOC4120

Step	Station	Action	Expected Results	Comments
126.				
127.	~	Save the record of s/c and instrument uplink statuses to a file for post test analysis.	The record correctly reflects data uplinked.	.Post test analysis EOC-4160
128.				
129.	~			
130.	~			

## EOC2.4 Memory Dump Telemetry Processing

### Summary of EOC2.4

*Generate a memory load from existing memory image*

*Modify an existing memory load to create a new load*

*Send load to SC*

### *Absolute Address Dump*

*Dump Initiate Command for location that corresponds to previous load*

*Initiate Dump Gather Command (for non-active scc, for Table, Activity Log, and Absolute Memory dump)*

*Generate Dump Report (data in hex, RT ID, # expected words, # actual words, User ID, dump cmd)*

*Compare master ground image to SCC memory dump Result is no difference*

*MPS modify contents of several locations that correspond to previous load*

*Dump Initiate Command for location that corresponds to previous load*

*Initiate Dump Gather Command (for non-active scc, for Table, Activity Log, and Absolute Memory dump)*

*Generate Dump Report (data in hex, RT ID, # expected words, # actual words, User ID, dump cmd)*

*Compare master ground image to SCC memory dump Results show differences*

### *Table Dump of RTCS table*

*Start PROC containing Dump procedures*

### *Dump Initiate Command*

*Initiate Dump Gather Command (for non-active scc, for Table, Activity Log, and Absolute Memory dump)*

*Generate Dump Report (data in hex, RT ID, # expected words, # actual words, User ID, dump cmd)*

*Compare master ground image to SCC memory dump*

*Instrument Microprocessor Dump (MISR dmp rate=gather cmd, MODIS 32-word partn, MOPITT st add 80C186 format)*

### *Dump with Timeout*

*Initiate dump*

*During transfer of dump packets to EOC, MPS or EDOS interrupt transmission*

### *Dump with Abort*

*Initiate dump*  
*Send Dump Abort command to RT*  
*Send CTIU Reset Gather Command to CTIU*  
  
*Any value added wrt FOS?? - No value added wrt MPS.*  
*Activity Log (table 18) Dump*  
*S/C GNC Table Dump ?*  
*Start Up ROM (SUROM) Diagnostic Dump ?*

Step	Station	Action	Expected Results	Comments
1.				
2.	~	Generate a memory load from an existing memory image		
3.	USER1	Modify an existing memory load to create a new load		
4.	CAC	Send load to SC		
5.	~	Absolute Address Dump		
6.	CAC	Dump Initiate Command for location that corresponds to previous load		
7.	CAC	Initiate Dump Gather Command (for non-active scc, for Table, Activity Log, and Absolute Memory dump)		
8.	CAC	Generate Dump <b>Report</b> (data in hex, RT ID, # expected words, # actual words, User ID, dump cmd)		

Step	Station	Action	Expected Results	Comments
9.	CAC	<b>Compare</b> master ground image to SCC memory dump Result is no difference		
10.	ETS	MPS modify contents of several locations that correspond to previous load		
11.	CAC	Dump Initiate Command for location that corresponds to previous load		
12.	CAC	Initiate Dump Gather Command (for non-active scc, for Table, Activity Log, and Absolute Memory dump)		
13.	CAC	Generate Dump <b>Report</b> (data in hex, RT ID, # expected words, # actual words, User ID, dump cmd)		
14.	CAC	<b>Compare</b> master ground image to SCC memory dump Results show differences		
15.				
16.	~	Table Dump of RTCS table		
17.	CAC	Start PROC containing Dump procedures		
18.	CAC	Dump Initiate Command		
19.	CAC	Initiate Dump Gather Command (for non-active scc, for Table, Activity Log, and Absolute Memory dump)		
20.	CAC	Generate Dump <b>Report</b> (data in hex, RT ID, # expected words, # actual words, User ID, dump cmd)		
21.	CAC	Compare master ground image to SCC memory dump		
22.	~	Instrument Microprocessor Dump (MISR dmp rate=gather cmd, MODIS 32-word part, MOPITT st add 80C186 format)		

Step	Station	Action	Expected Results	Comments
23.	~	Dump with Timeout		
24.	CAC	Initiate dump		
25.	EDOS/ ETS	During transfer of dump packets to EOC, MPS or EDOS interrupt transmission		
26.				
27.	~	Dump with Abort		
28.	CAC	Initiate dump		
29.	CAC	Send Dump Abort command to RT		
30.	CAC	Send CTIU Reset Gather Command to CTIU		
31.				
32.				
33.				

## EOC2.5 Command Operations Protocol-1 (COP-1) Processing

### Summary of EOC2.5

*Open tm display pages containing desired CLCW, TV, and PSC statuses*

*Send EDOS a CTB, monitor for CEB response*

*Ensure ETS MPS has all COP processing enabled*

*Ensure ETS MPS command counter is the same as FOS command counter (cmd counter=frame sequence number=VR)*

*Send FOP INIT CHECK (synchs ground to s/c cmd counter)*

*Verify receipt of clean CLCW from ETS*

*~Verify FOS retransmission of commands and retrans count*

*~Retransmit command queue*

*Set cmd sliding window width to 10 (FOP WINDOW=10, )*

*Turn TV OFF and CV OFF*

*MPS disable sending of CLCW*

*Send 11 valid commands (to establish a 'queue')*

*Verify FOS generates a CLCW timeout alert (time based on FOP timeout value)*

*Set up EDOS to not pass the next command (if not possible, can decrement MPS's counter)*

*Send a 12<sup>th</sup> valid command (not received by MPS)*

*Set up EDOS for normal commanding*

*MPS enable sending of CLCW for next command and forward (do not send CLCWs for receipt of previous cmds)*

*Send a 13<sup>th</sup> valid command (rejected by MPS due to cmd counter mismatch)*

*Verify request for retransmission of commands received by FOS*

*Verify last 10 commands in queue( ) successfully resent and received (MPS will reject 1<sup>st</sup> 8 cmds as already received, then accept last 2)*

*Turn TV ON and CV ON*

*~Operator change # of retrans; Force retransmitting max # of times*

*Operator change # of retrans to maximum value (FOP TRAN=xxx)*

*Send a valid command*

*Set up EDOS to not pass the next command*

*Send a 2<sup>nd</sup> valid command (not received by MPS)*

- Set up EDOS for normal commanding*
- Send a 3<sup>rd</sup> valid command (rejected by MPS)*
- Verify request for retransmission of commands received by FOS*
- Set MPS to reject all future commands*
- (need MPS to receive valid 3<sup>rd</sup> command but reject cmd retransmissions)**
- ETS MPS clear “WAIT” bit in CLCW, send to FOS*
- Verify FOS retransmits cmd until default retrans value is met*
- Reset MPS to normal command processing*
- Synch FOS command counter to MPS command counter (FOP VS=xx)*
- ~Operator change # of retrans to 1; (No retransmission)*
- Operator change # of retrans to 1 (FOP TRAN=1)*
- Send a valid command*
- Set up EDOS to not pass the next command*
- Send a 2<sup>nd</sup> valid command (not received by MPS)*
- Set up EDOS for normal commanding*
- Send a 3<sup>rd</sup> valid command (rejected by MPS)*
- Verify request for retransmission of commands received by FOS*
- Verify FOS does not retransmit cmd*
- Reset MPS to normal command processing*
- Synch FOS command counter to MPS command counter*
- ~Synch s/c cmd counter to ground*
- Send EDOS a CTB, monitor for CEB response*
- Ensure ETS MPS has all COP processing enabled*
- Record ETS MPS command counter, and FOS command counter*
- Send FOP INIT VR=xx (where xx is different than current command counter) ([How relate to FOP VS=xx?](#))*
- Verify receipt of clean CLCW from ETS*
- Record ETS MPS command counter, and FOS command counter (verify set to VR)*
- Send a valid command*
- Verify successful cmd transmission and receipt*
- Record ETS MPS command counter, and FOS command counter (verify set to VR+1)*

- Clear lockout flag
  - Send EDOS a CTB, monitor for CEB response
  - Ensure ETS MPS has all COP processing enabled
  - Set MPS cmd counter to a value >90 from FOS cmd counter
  - Record ETS MPS command counter, FOS command counter, CLCW Report Value, and CLCW Farm B counter
  - Ensure CLCW lockout flag is set
  - Send FOP INIT UNLOCK (post-test analysis - verify format of BC cmd)
  - Verify CLCW lockout flag is clear
  - Record ETS MPS command counter, FOS command counter, CLCW Report Value, and CLCW Farm B counter
  - Send a valid command
  - Verify successful cmd transmission and receipt
  - Ignore synch (FOP INIT NOCHECK)
    - Send EDOS a CTB, monitor for CEB response
    - Ensure ETS MPS has all COP processing enabled
    - Disable telemetry from ETS MPS
    - Set MPS cmd counter to a value not equal to FOS cmd counter
    - Record ETS MPS command counter, and FOS command counter
    - Send FOP INIT NOCHECK
    - Send a valid command
    - (Does NOCHECK ignore mismatched cmd counters?? Why not send INIT VR first then NOCHECK ? Does INIT VR need CLCW status and NOCHECK does not ?? Can use NOCHECK when receiving tm? Can tell sc to ignore cmd counter?)
    - Verify successful cmd transmission and receipt
  - TIMEOUTTYPE
    - Ensure TV ON and CV ON
    - Set TIMEOUTTYPE to SUSPEND
    - MPS disable sending of CLCW
    - Set FOP TIMER to minimum value
    - Send a valid command
    - Verify FOS “suspends” based on FOP timeout value (Suspends what????)
    - Attempt to send another valid command

Step	Station	Action	Expected Results	Comments
<p><i>Clear the suspense ('TBD')</i></p> <p><i>Set the FOP TIMER to maximum value</i></p> <p><i>Set TIMEOUTTYPE to ALERT</i></p> <p><i>Send a valid command</i></p> <p><i>Verify FOS generates an alert based on FOP timeout value</i></p> <p><i>Attempt to send another valid command</i></p> <p><i>MPS enable sending of CLCW</i></p> <p><i>Sliding Window &gt; CLTUQTY (<b>observe timeout. CMMO TIM p29</b>)</i></p> <p><i>Set cmd sliding window width to maximum (FOP WINDOW=xxx, )</i></p> <p><i>Set the FOP TIMER to maximum value</i></p> <p><i>Turn TV OFF and CV OFF</i></p> <p><i>MPS disable sending of CLCW</i></p> <p><i>Send 11 valid cmds (to establish a 'queue')(RT cmd = 1 CLTU per CDB)</i></p> <p><i>Verify FOS generates a CLCW timeout alert (time based on FOP timeout value)</i></p> <p><i>Set up EDOS to not pass the next command (if not possible, can decrement MPS's counter)</i></p> <p><i>Send a valid command (not received by MPS)</i></p> <p><i>Set up EDOS for normal commanding</i></p> <p><i>MPS enable sending of CLCW for next command and forward (do not send CLCWs for receipt of previous cmds)</i></p> <p><i>Send a 12<sup>th</sup> valid command (rejected by MPS due to cmd counter mismatch)</i></p> <p><i>Verify request for retransmission of commands received by FOS</i></p> <p><i>Verify last 10 commands in queue( ) successfully resent and received (MPS will reject 1<sup>st</sup> 8 cmds as already received, then accept last 2)</i></p> <p><i>Monitor for timeout due to Sliding Window size being greater than the number of CLTUs per CDB.</i></p> <p><i>Clear up mess</i></p> <p><i>Turn TV ON and CV ON</i></p> <p><i>&amp; Add., RESUME_AD ?.</i></p>				

Step	Station	Action	Expected Results	Comments
1.	CAC	Open tm display pages containing desired CLCW, TV, and PSC statuses		
2.	CAC	Configure the control center for SN SSA service via the AM1 HGA antenna. In the Control Window's ECL commandline, enter: <b>CMDCFG PREREQUISITE=ENABLE PLOP=1 ANT=HGA CHAN=SSA PRIM=1</b>	Path configuration accepted. Event_Display status message reflects change.	EOC4200
3.	MPS	Bring up and configure ETS MPS for receiving commands at 10kbps and to transmit 16k HK telemetry to EOC.		
4.	CAC	Send EDOS a CTB, monitor for CEB response		
5.	ETS	Ensure ETS MPS has all COP processing enabled		
6.	ETS/ CAC	Ensure ETS MPS command counter is the same as FOS command counter (cmd counter=frame sequence number=VR)		
7.	CAC	Send FOP INIT CHECK (synchs ground to s/c cmd counter)		
8.	CAC	Verify receipt of clean CLCW from ETS		
9.	~	Verify FOS retransmission of commands and retrans count		
10.	~	Retransmit command queue		
11.	CAC	Set cmd sliding window width to 10 (FOP WINDOW=10, )		
12.	CAC	In the C_W window, take command authority. <b>TAKE COMMAND STRING=100</b>	In Event_Display observe message that command authority has been assigned.	
13.	CAC	Click on Tools... button	Tools menu displayed.	
14.	CAC	Double-click on Command Control line.	CCW/CMW window is displayed	

Step	Station	Action	Expected Results	Comments
15.	CAC	In the CCW/CMW window enter: <b>100</b> for String ID, <b>AM1</b> for Spacecraft ID. Click <b>OK</b> .	Command Control Window (CCW) is displayed, not Command Monitor Window.	
16.	CAC	Resize the Command Control Window. Lengthen the Status field.	Statuses in the STATUS field can be seen when script is resumed.	
17.	CAC	Ensure Mode is set to Auto, if not: In the CCW menu, click on <b>Config</b> , Click the <b>Auto</b> button	On CCW upper status bar: Status of Mode is Auto (default)	
18.	CAC	Turn TV OFF and CV OFF		
19.	ETS	MPS disable sending of CLCW		
20.	CAC	Send 11 valid commands (to establish a 'queue')		
21.	CAC	Verify FOS generates a CLCW timeout alert (time based on FOP timeout value)		
22.	EDOS/ ETS	Set up EDOS to not pass the next command (if not possible, can decrement MPS's counter)		
23.	CAC	Send a 12 <sup>th</sup> valid command (not received by MPS)		
24.	EDOS/ ETS	Set up EDOS for normal commanding		
25.	ETS	MPS enable sending of CLCW for next command and forward (do not send CLCWs for receipt of previous cmds)		
26.	CAC	Send a 13 <sup>th</sup> valid command (rejected by MPS due to cmd counter mismatch)		
27.	CAC	Verify request for retransmission of commands received by FOS		

Step	Station	Action	Expected Results	Comments
28.	CAC	Verify last 10 commands in queue( ) successfully resent and received (MPS will reject 1 <sup>st</sup> 8 cmd as already received, then accept last 2)	CDB.DAT	
29.	CAC	Turn TV ON and CV ON		
30.	~	Operator change # of retrans; Force retransmitting max # of times		
31.	CAC	Operator change # of retrans to maximum value (FOP TRAN=xxx)		
32.	CAC	Send a valid command		
33.	EDOS/ ETS	Set up EDOS to not pass the next command		
34.	CAC	Send a 2 <sup>nd</sup> valid command (not received by MPS)		
35.	EDOS/ ETS	Set up EDOS for normal commanding		
36.	CAC	Send a 3 <sup>rd</sup> valid command (rejected by MPS)		
37.	CAC	Verify request for retransmission of commands received by FOS		
38.	ETS	Set MPS to reject all future commands ( <b>need MPS to receive valid 3<sup>rd</sup> command but reject cmd retransmissions</b> )		
39.	ETS	ETS MPS clear "WAIT" bit in CLCW, send to FOS		
40.	CAC	Verify FOS retransmits commands until default retrans value is met		
41.	ETS	Reset MPS to normal command processing		
42.	CAC	Synch FOS command counter to MPS command counter (FOP VS=xx)		

Step	Station	Action	Expected Results	Comments
43.	~	Operator change # of retrans to 1; (No retransmission)		
44.	CAC	Operator change # of retrans to 1 (FOP TRAN=1)		
45.	CAC	Send a valid command		
46.	EDOS/ ETS	Set up EDOS to not pass the next command		
47.	CAC	Send a 2 <sup>nd</sup> valid command (not received by MPS)		
48.	EDOS/ ETS	Set up EDOS for normal commanding		
49.	CAC	Send a 3 <sup>rd</sup> valid command (rejected by MPS)		
50.	CAC	Verify request for retransmission of commands received by FOS		
51.	CAC/ ETS	Verify FOS does not retransmit cmd		
52.	ETS	Reset MPS to normal command processing		
53.	CAC	Synch FOS command counter to MPS command counter		
54.	~	Synch s/c cmd counter to ground		
55.	CAC	Send EDOS a CTB, monitor for CEB response		
56.	ETS	Ensure ETS MPS has all COP processing enabled		
57.	ETS/ CAC	Record ETS MPS command counter, and FOS command counter		
58.	CAC	Send FOP INIT VR=xx (where xx is different than current command counter) ( <a href="#">How relate to FOP VS=xx?</a> )		

Step	Station	Action	Expected Results	Comments
59.	CAC	Verify receipt of clean CLCW from ETS		
60.	ETS/ CAC	Record ETS MPS command counter, and FOS command counter (verify set to VR)		
61.	CAC	Send a valid command		
62.	CAC/ ETS	Verify successful cmd transmission and receipt		
63.	ETS/ CAC	Record ETS MPS command counter, and FOS command counter (verify set to VR+1)		
64.	~	Clear lockout flag		
65.	CAC	Send EDOS a CTB, monitor for CEB response		
66.	ETS	Ensure ETS MPS has all COP processing enabled		
67.	CAC	Set MPS cmd counter to a value >90 from FOS cmd counter		
68.	ETS/ CAC	Record ETS MPS command counter, FOS command counter, CLCW Report Value, and CLCW Farm B counter		
69.	ETS	Ensure CLCW lockout flag is set		
70.	CAC	Send FOP INIT UNLOCK (post-test analysis - verify format of BC cmd)		
71.	ETS	Verify CLCW lockout flag is clear		
72.	ETS/ CAC	Record ETS MPS command counter, FOS command counter, CLCW Report Value, and CLCW Farm B counter		
73.	CAC	Send a valid command		
74.	CAC/ ETS	Verify successful cmd transmission and receipt		
75.	~	Ignore synch (FOP INIT NOCHECK)		

Step	Station	Action	Expected Results	Comments
76.	CAC	Send EDOS a CTB, monitor for CEB response		
77.	ETS	Ensure ETS MPS has all COP processing enabled		
78.	ETS	Disable telemetry from ETS MPS		
79.	ETS	Set MPS cmd counter to a value not equal to FOS cmd counter		
80.	ETS/ CAC	Record ETS MPS command counter, and FOS command counter		
81.	CAC	Send FOP INIT NOCHECK		
82.	CAC	Send a valid command	(Does NOCHECK ignore mismatched cmd counters?? Why not send INIT VR first then NOCHECK ? Does INIT VR need CLCW status and NOCHECK does not ?? Can use NOCHECK when receiving tm? Can tell sc to ignore cmd counter?)	
83.	CAC/ ETS	Verify successful cmd transmission and receipt		
84.	~	TIMEOUTTYPE		
85.	CAC	Ensure TV ON and CV ON		
86.	CAC	Set TIMEOUTTYPE to SUSPEND		
87.	ETS	MPS disable sending of CLCW		
88.	CAC	Set FOP TIMER to minimum value		
89.	CAC	Send a valid command		
90.	CAC	Verify FOS “suspends” based on FOP timeout value ( <a href="#">Suspends what????</a> )		
91.	CAC	Attempt to send another valid command		
92.	CAC	Clear the suspense ( <a href="#">TBD</a> )		
93.	CAC	Set the FOP TIMER to maximum value		
94.	CAC	Set TIMEOUTTYPE to ALERT		

Step	Station	Action	Expected Results	Comments
95.	CAC	Send a valid command		
96.	CAC	Verify FOS generates an alert based on FOP timeout value		
97.	CAC	Attempt to send another valid command		
98.	ETS	MPS enable sending of CLCW		
99.	~	Sliding Window > CLTUQTY ( <a href="#">observe timeout. CMMO TIM p29</a> )		
100.	CAC	Set cmd sliding window width to maximum (FOP WINDOW=xxx, )		
101.	CAC	Set the FOP TIMER to maximum value		
102.	CAC	Turn TV OFF and CV OFF		
103.	ETS	MPS disable sending of CLCW		
104.	CAC	Send 11 validcmds (to establish a 'queue')(RT cmd = 1 CLTU per CDB)		
105.	CAC	Verify FOS generates a CLCW timeout alert (time based on FOP timeout value)		
106.	EDOS/ ETS	Set up EDOS to not pass the next command (if not possible, can decrement MPS's counter)		
107.	CAC	Send a valid command (not received by MPS)		
108.	EDOS/ ETS	Set up EDOS for normal commanding		
109.	ETS	MPS enable sending of CLCW for next command and forward (do not send CLCWs for receipt of previous cmds)		
110.	CAC	Send a 12 <sup>th</sup> valid command (rejected by MPS due to cmd counter mismatch)		
111.	CAC	Verify request for retransmission of commands received by FOS		

Step	Station	Action	Expected Results	Comments
112.	CAC/ ETS	Verify last 10 commands in queue( ) successfully resent and received (MPS will reject 1 <sup>st</sup> 8 cmd as already received, then accept last 2)		
113.	CAC	Monitor for timeout due to Sliding Window size being greater than the number of CLTUs per CDB.		
114.	CAC	Re-establish default FOP values		
115.	CAC	Turn TV ON and CV ON		
116.				
117.	~	Add RESUME_AD ?.		
118.				

Test Termination:

Step	Station	Action	Expected Results	Comment
1.	UWS	Collect all necessary screen snaps, dumps, etc. needed for post-test analysis and verification.		
2.	UWS	Bring down User Work Stations (UWS). In the UNIX window where the user station was initiated, enter: <b>MyKill</b>		
3.	UWS	After UWS killed, check for undesirable processes. <b>ps -ax</b>		
4.	UWS	Open any iconized processes, or pages that didn't close. Close the windows. Under the <b>File</b> menu heading select <b>Quit</b> .	Window closes.	
5.	UWS	Kill all undesirable processes - Processes with a /fos/test/aml/bin/ ... prefix and owner is not "root" (there may be others).  Initially, as process owner, use <b>MyKill</b> to shutdown the process. If processes are still active use <b>kill "pid"</b> for each undesirable process.  Type <b>ps -ef</b> again to verify.	Notes: The user may need to be logged in as the owner of the processes in order to kill them.	
6.	UWS	Bring up the FOS Homepage on Netscape (May be already open in mss2eoc SUN room 2): <b>netscape</b>	FOS Database Access Page displayed. If not automatically displayed, check Netscape's bookmarks. If no bookmark enter the url: <b>http://198.118.199.20/FosDbHome.html</b>	

Step	Station	Action	Expected Results	Comment
7.	UWS	Verify no endpoints exist on UWS: Click on <b>NameServer Database</b> Click on <b>Clear Form</b> In EntryID field enter: <b>fos#oe</b> (where # is UWS number) Click on <b>Submit</b> .	“Total matches = 0”. Note: If any endpoints exist recheck for live processes/endpoints on the UWS using ps -ax . They must all be removed/killed prior to system startup. As a last resort use Kill -9 “pid”.	
8.	RTS	Bring down Real Time Server (fosoc6). In the UNIX window where the RTS was initiated, enter: <b>MyKill</b>	Wait 1-5 minutes	
9.	RTS	After RTS killed, check for undesirable processes.  <b>ps -ef</b>		
10.	RTS	Kill all undesirable processes - Processes with a /fos/test/aml/bin/... prefix and owner is not “root” (there may be others).  Initially, as process owner, use <b>MyKill</b> to shutdown the process. If processes are still active use <b>kill “pid”</b> for each undesirable process.  Type <b>ps -ef</b> again to verify.	Notes: The user may need to be logged in as the owner of the processes in order to kill them.	
11.	RTS	Bring up the FOS Homepage on Netscape (May be already open in mss2eoc SUN room 2): <b>netscape</b>	FOS Database Access Page displayed. If not automatically displayed, check Netscape's bookmarks. If no bookmark enter the url:  <b>http://198.118.199.20/FosDbHome.html</b>	

Step	Station	Action	Expected Results	Comment
12.	RTS	Verify no endpoints exist on RTS: Click on <b>NameServer Database</b> Click on <b>Clear Form</b> In EntryID field enter: <b>fosseoc6</b> Click on <b>Submit</b> .	“Total matches = 0”. Note: If any endpoints exist recheck for live processes/endpoints on the Real Time Server using ps -ef . They must all be removed/killed prior to system startup. As a last resort use Kill -9 “pid”.	
13.	DS	Bring down Data Server (fosseoc7). In the UNIX window where the RTS was initiated, enter: <b>MyKill</b>	Wait 1-5 minutes.	
14.	DS	After DS killed, check for undesirable processes.  <b>ps -ef</b>		
15.	DS	Kill all undesirable processes - Processes with a /fos/test/aml/bin/... prefix and owner is not “root” (there may be others). Initially, as process owner, use <b>MyKill</b> to shutdown the process. If processes are still active use <b>kill -USR1 “pid”</b> for each active process, then use <b>kill -9 “pid”</b> for each undesirable process. Type <b>ps -ef</b> again to verify.	Notes: “kill -USR1” saves data created since the Data Server was brought up. Use “kill -9” only after “kill -USR” on the Data Server or Real Time Server; or data may be lost. The user may need to be logged in as the owner of the processes in order to kill them.	
16.	DS	Bring up the FOS Homepage on Netscape (May be already open in mss2eoc SUN room 2): <b>netscape</b>	FOS Database Access Page displayed. If not automatically displayed, check Netscape’s bookmarks. If no bookmark enter the url: <b>http://198.118.199.20/FosDbHome.html</b>	

Step	Station	Action	Expected Results	Comment
17.	DS	Verify no endpoints exist on DS: Click on <b>Name</b> server Database Click on <b>Clear Form</b> In EntryID field enter: <b>foseoc7</b> Click on <b>Submit</b> .	“Total matches = 0”. Note: If any endpoints exist recheck for live processes/endpoints on the Data Server using ps -ef . They must all be removed/killed prior to next system startup.	
18.	EOC	Verify no endpoints exist on FOS: Click on <b>Name</b> server Database Click on <b>Clear Form</b> Click on <b>Submit</b> .	“Total matches = 0”. Note: If any endpoints exist recheck for live processes/endpoints on the User Work Stations, Real Time Server, and Data Server using ps -ef or ps -ax. All processes must be removed/killed prior to system startup.	
19.				

## Appendix: Test Package Requirements Summary

### Requirements to be Verified:

Requirement	Description	Test Cases
EDOS-4.1.1.2#B	EDOS shall interface with the EOC to receive Command Data Blocks (CDBs), Command Test Blocks, and Operations Management Data.	EOC2.1 EOC2.2 EOC2.3
EDOS-4.1.1.4#B	EDOS shall provide the capability to transfer Command Link Control Word (CLCW) EDUs to the EOC.	EOC2.1 EOC2.2 EOC2.3
EDOS-4.2.1.5#B	The EDOS-EOC interface shall provide the capability to support the transfer of real-time forward link data at a rate of up to 10 kbps.	EOC2.1 EOC2.2 EOC2.3
EDOS-4.6.1.3#B	EDOS shall receive real-time forward link data using UDP/IP.	EOC2.1 EOC2.2 EOC2.3
EOC-0040#B <i>Partial EOC1</i>	The EOC shall interface with EDOS for coordinating EDOS-provided services required by the EOC.	EOC2.1 EOC2.2 EOC2.3
EOC-3238#B	Within 1 minute of detecting a predefined emergency/contingency situation, the EOC shall prepare spacecraft and instrument commands for transmission to EDOS.	EOC2.1 EOC2.2 EOC2.3
EOC-4008#B	The EOC shall be capable of transmitting commands via Ecom.	EOC2.1 EOC2.2 EOC2.3.
EOC-4010#B <i>Partial EOC3</i>	For each spacecraft and its instruments, the EOC shall prepare uplink data that conform to the CCSDS Telecommand Standard.	EOC2.1 EOC2.2 EOC2.3 EOC2.5
EOC-4015#B	The EOC shall provide the capability to build real-time commands based on operator input and validate the generated commands.	EOC2.1 EOC2.2 EOC2.3.
EOC-4018#B	The EOC shall validate instrument real-time command groups.	EOC2.1 EOC2.2 EOC2.3.
EOC-4020#B	The EOC shall merge the real-time commands supplied by the spacecraft operator, command groups, and the spacecraft and instrument memory loads into one uplink stream.	EOC2.1 EOC2.2 EOC2.3.
EOC-4100#B	The EOC shall provide the capability to control the uplink of critical commands by requiring a second positive response from the operator.	EOC2.1 EOC2.2 EOC2.3
EOC-4120#B	The EOC shall provide the capability to verify via telemetry the successful receipt of all commands by the spacecraft and instruments.	EOC2.1 EOC2.2 EOC2.3 EOC2.5
EOC-4125#B	The EOC shall provide the capability to verify via telemetry the successful execution of spacecraft commands.	EOC2.1 EOC2.2 EOC2.3
EOC-4130#B	The EOC shall provide the capability to receive and evaluate command transmission status information from EDOS.	EOC2.1 EOC2.2 EOC2.3

Requirement	Description	Test Cases
EOC-4140#B	The EOC shall generate command-related event messages for display and for history logging to include: a. Command uplink status <i>Note: EOC-4140#A identified as mission critical in 9/14/96 RTM. EOC-4140#B is not identified as mission critical.</i>	EOC2.1 EOC2.2 EOC2.3
EOC-4160#B	The EOC shall maintain a record of the uplink status of all spacecraft and instrument real-time commands.  The EOC shall maintain a record of the uplink status of all spacecraft and instrument memory loads.	EOC2.1 EOC2.2 EOC2.3  EOC2.4
EOC-4200#B <i>Partial</i> <b>EGS2</b>	The EOC shall support several uplink rates to the spacecraft, which include at a minimum the following: a. 10 kilobits per second (kbps) (SSA uplink) b. 1 kbps (SMA uplink) c. 125 bits per second (bps) (SSA uplink during contingency operations)	EOC2.1 EOC2.2 EOC2.3
EOC-5010#B <i>Partial</i> <b>ICTI3</b>	The EOC shall receive from EDOS the following telemetry data types in CCSDS packets containing: a. Real-time spacecraft and instrument housekeeping data b. Spacecraft recorder housekeeping data c. SCC memory dump data	EOC2.4
EOC-5130#B	The EOC shall determine the best estimate for SCC memory contents.	EOC2.4
EOC-6150#B	The EOC shall provide the capability to maintain a master ground image of the SCC spacecraft memory.	EOC2.4
EOC-6160#B	The EOC shall provide the capability to compare the master ground image and the SCC memory dump.	EOC2.4
FOS-1130#B	The FOS shall check the binary pattern of all outgoing commands against a user-defined, configuration controlled table and halt transmission whenever a match is found.	EOC2.1 EOC2.2 EOC2.3

